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ABSTRACT

It is posited that examination of the financial problems of private institutions must go beyond the readily available statistics on enrollment and surpluses or deficits into how private colleges compete and what is happening to their competitive position vis-a-vis the public institutions. Attention is directed toward: (1) the change in reputation of private colleges to prospective bright students; (2) the impact of a limited number of state policy variables on the altered preferences; and (3) the effect of institutional policies. Nichols' data collection in 1972-73 was replicated with "able students," defined as those high school juniors scoring among the top one-third of the students taking the National Merit Scholarship Qualifying Tests. Institutional analysis of the data shows that if a college wants to attract good students, it should: (1) charge low or no tuition; (2) hire the most highly qualified faculty available; (3) attract large amounts of research dollars; and (4) avoid general fiscal constraints. It is shown that public institutions are becoming more appealing to bright students in terms of absolute selections and more appealing even when selections are corrected for the size of the institutions. Methodological limitations of the study are noted. (LBH)

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AERA - Division A

Financing in Higher Education

"Private Higher Education: Beyond
Surpluses (Deficits) and Enrollments" *

by

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U S DEPARTMENT OF HEALTH,
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March 10, 1975

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INTRODUCTION

A report in the Chronicle of Higher Education, based on N.C.E.S. data, indicates that private institutions as a group have not been in a deficit situation since 1970-71.¹ Another recent Chronicle of Higher Education report indicates that more than half of the private colleges in this country² have increased their enrollment this year. Is this evidence that the distress of private higher education in the United States is either greatly exaggerated or has been ameliorated in recent years? This paper offers evidence that neither is the case. It is posited that one must look beyond the readily available statistics on enrollments and surpluses (or deficits). Researchers must look at how private colleges compete and what is happening to their competitive position vis-a-vis the public institutions. Indeed, when a commercial enterprise is offered for sale, often a significant portion of the sale price is termed "good will." This reflects the realization that a corporation is worth more than the sum of its physical assets. Reputations are particularly important when the product is as intangible and as difficult to measure as education.

How do private colleges compete? Obviously there is no simple answer. No two institutions compete on identical terms. However, many researchers consider the dimension of academic prestige and selectivity to be of considerable importance to many institutions.^{3,4,5} If this is so, then the institution's reputation among bright students is a particularly valuable resource. This paper reports on: 1) the change in reputation of private colleges to prospective bright students, 2) the impact of a limited number of state policy variables on the altered preferences, and 3) the effect of institutional policies.

MEASURING CHANGE IN ATTRACTIVENESS

The National Merit Scholarship Corporation asks high school juniors taking the qualifying exam to select the institution that they would most like to attend. Using the 1964-65 data, Robert Nichols summed the selections for colleges.⁶ The coverage was wide. Nearly 800,000 students selected more than 1600 separate institutions of higher education. Nichols then formed eleven indices from the data. After analyzing them he concluded that:

The best single indicator of selectivity among the popularity indices was popularity with high ability students of both sexes relative to size (enrollment). This index correlated .87 with the number of applications received from high ability students of both sexes relative to the number of students accepted for admission.⁷

This research replicated Nichols' data collection in 1972-73. Although there were a number of problems in precisely duplicating the data base, none⁸ seem to have seriously biased the results. Tables 1 and 2 summarize the student selection data and the institutional selections. While the institutions seem to well represent a broad cross-section of American higher education,⁹ junior and community colleges tend to be underrepresented.

For the purposes of Nichols' study and this study, "able students" are defined as those high school juniors scoring among the top one-third of the students taking the National Merit Scholarship Qualifying Tests for the academic years 1964-65 and 1972-73. "Popularity" is defined as the absolute number of times an institution is selected by "able students." "Popularity" multiplied by 100 and divided by entering freshman enrollment for the respective years,^{10,11} is termed "attractiveness." This is identical to Nichols' pre-

viously cited index (popularity with high ability students of both sexes relative to size).

"Change in attractiveness" is measured in two ways. For clarity of reporting, a "percentage change index" is formed. However, there are a number of minor statistical problems with such a measure.¹² Another index of change is the "transformed index." It is the square root of "attractiveness" in 1972-73 minus the square root of "attractiveness" in 1964-65. Although this index avoids the problems associated with "percentage change," it is perhaps less intuitive. Fortunately, both indices yield very similar results.

A summary of these measures follows:

Able students: High school junior who took the National Merit Scholarship Qualifying Test in 1964-65 and 1972-73 and scored among the top one-third of all students participating in the respective years.

Popularity: The number of selections a given college received in either test year by able students.

Attractiveness: The number of selections a given college received in either year divided by the number of entering freshmen in that year; the quotient multiplied by 100.

Percentage change in attractiveness: Attractiveness in 1972-73 minus attractiveness in 1964-65 divided by attractiveness in 1964-65; the quotient multiplied by 100.

Transformed index: The square root of attractiveness in 1972-73 minus the square root of attractiveness in 1964-65.

Henceforth, these terms will not be placed in quotes. The reader is reminded that these are operational definitions.

Table 1

Summary of Student Choice Data

	1964-65	1972-73
Total high school juniors taking examination	795,780	1,056,529
Invalid college code or no definite plans	207,735	526,518
Not available for 1972-73 analysis because less than 25 of same sex chose school or U.S. military IHL	26,273	-
Not available because school selected does not have 1964-65 information	-	64,356
Total available selections	561,772	465,655
Number scoring in the top one-third of all students taking the examination	203,918	169,171

Table 2

Summary of Institution Selections

Total available choices in 1964-65	1,629
Eliminated by Nichols' more than twenty-five criterion	301
No 1972-73 information or U.S. military IHL	100
Schools used from 1964-65	1,228
Total available choices in 1972-73	1,863
No 1964-65 information or U.S. military IHL	635
Schools used from 1972-73	1,228

THE ANALYSES

Public v. Private: The first stage of the analysis contrasts changes in attractiveness, popularity, and enrollment at 501 public institutions and 718 private institutions. Further, the institutions are segmented into thirds by their attractiveness levels in 1964-65. For example, the most attractive third of the private colleges is contrasted with the most attractive third of the public colleges.

State Analysis: An analysis is made of the impact of a limited number of state policies on the relative ability of private colleges to retain the attention of bright students. Forty-two states for which data is available on at least two public and two private institutions are included. The dependent variable is the difference between the average score on the transformed index of the private institutions in the state and the average score on the transformed index of the public institutions in the state. The independent variables included were: 1) a measure of tuition charged at public institutions relative to state and local support of public institutions, 2) the growth in the number of public institutions in that state, 3) state scholarship aid available to students attending private institutions within the state, and 4) direct state aid to private institutions in the state.

In summary the variables for the state analysis are:

i = State

DA_i = Average change in attractiveness on the transformed index of private IHL minus average attractiveness change of public IHL in State i.

$TUITEF_i$ = "Tuition effort": ratio of tuition income to state and local income at public institutions averaged for 1965 and 1972.

$PUBGWT\bar{H}_1$ = Number of new public colleges constructed in the state from 1965 to 1972.

$DIRPRV_1$ = Direct aid to private institutions per FTE in private colleges and universities in State i (average for 1967-68 and 1968-69).

$SCHOLAR_1$ = Scholarship dollars available to students attending private IHL per FTE enrolled in private colleges and universities (averaged for 1967-68 and 1968-69).

There are a number of serious methodological problems with this analysis. First, the number of cases (42) is uncomfortably small. Second, state borders are not inviolate and the policies of one state affect the colleges in another. Third, only easily quantifiable policy variables were included. Finally, after collecting data on state aid in the years 1967-68 and 1968-69,^{13,14} it was found that only five states (Illinois, Michigan, New York, Pennsylvania, and Rhode Island) devoted as much as 1/100th to state scholarships as they did to direct operating support of state institutions. And only two states (New York and Pennsylvania) budgeted as much as 1/100th to direct aid to private colleges as they did to direct operating support of public colleges in the same years. Furthermore, if this aid represents a reaction to a problem rather than the anticipation of a problem, a counter-intuitive correlation would be uncovered.

With these major reservations a least squares multiple regression was used to analyze the impact of state tuition, student aid, institutional aid, and growth policies upon the success of private higher education relative to public higher education in the competition for able students. The regression equation is:

$$DA_1 = f(TUITEF_1, PUBGWT\bar{H}_1, DIRPRV_1, SCHOLAR_1)$$

Institutional Analysis: Rather than rely on more readily available data for all 1228 colleges and universities, detailed data was solicited from three hundred colleges. The one hundred and six which responded with complete information

represent approximately eight percent of the entire list and approximately five percent of all colleges and universities in the nation. There are only eight two-year colleges in the sample, and this number obviously underrepresents them. However, with this exception, it is believed that the sample well represents not only the complete list of 1228 colleges, but all of higher education in the country, as well.

Twenty-eight variables are initially considered. See Appendix A. This number is clearly too large relative to the number of cases. Furthermore, there is a problem of severe multi-collinearity. To reduce the number of variables and limit the collinearity problem, the independent variables are factor analyzed by the principal components method. The only variables included in the multiple regression are the highest loading variables on each of the identified factors and special control variables. Attractiveness in 1964-65 (ATTRACT) is included to control for random error in the index and it turns out to be quite significant. Two other control variables, change in the number of NMSC scholarships sponsored and a dummy variable for technical institutions, show no significance and are eliminated from the analysis.

The varimax rotated factor matrix is presented in Appendix B. Although seven factors are identified, the seventh one had no variables loading as highly as 0.40 and it is dropped.

An interpretation of the factors, the highest loading variables on each factor, the variable abbreviations, and the factor loading of the variables follow. a) Factor one appears to be a general academic eminence dimension;

highest loading variable is doctorates on the faculty per student (Ph.D.) at 0.96. b) Factor two denotes private/public control; highest loading variable is tuition (TUITION) at 0.89. c) Factor three seems to represent a general fiscal dimension; highest loading variable is surplus (deficit) per student (SURPLUS) at -0.88. d) Factor four is likely a research dimension; the highest loading variable is change in research income per student (DRESCH) at 0.92. e) Factor five has no interpretation; change in doctorates on the faculty (DPHD) is the highest loading variable at 0.84. g) Factor six has no interpretation; average room and board charges (LVNG) is the highest loading variable at 0.92. The interested reader may examine Appendix B.

The variables used in the regression and the expected coefficient signs are summarized in Table 3. The expected signs are self-explanatory except, perhaps, the negative sign for SURPLUS. It was anticipated that a college could maintain a higher level of services and thus raise its attractiveness if it were willing to sustain deficits.

The regression equation is:

Change in attractiveness = f(ATTRACT, Ph.D., TUITION, SURPLUS, DRESCH,
DPHD, LVNG)

Table 3 Summary of Variables Used in Regression

<u>Variable</u>	<u>Abbreviation</u>	<u>Reason for Inclusion</u>	<u>Expected Sign</u>
Attractiveness score in 1964-65	ATTRACT	control	-
Doctorates on the faculty per student	PH.D.	factor 1	+
Tuition	TUITION	factor 2	-
Surplus (deficit) per student	SURPLUS	factor 3	-
Change in research income per student	DRESCH	factor 4	+
Change in the doctorates on the faculty per student	DPHD	factor 5	+
Room and Board Charges	LVNG	factor 6	-

RESULTS

Public v. Private: The average institution was chosen by thirty-three fewer able students, enrolled seventy-one more freshmen, and declined 0.648¹⁵ on the transformed index. These declines were expected because there were fewer net selections spread over more colleges and universities of which most had expanded enrollments. However, there were marked differences between the sectors. The average private college is still more attractive (on this measure) than the average public college. But the gap has narrowed considerably. (See Table 3.) While the average public college rose 15% on the percent-¹⁶ age change index, the average private college dropped 9%. This difference is highly significant and could have occurred by chance less than one time in ten thousand. The differences are even more striking when changes in absolute selections and changes in enrollment are examined.

The average public institution was selected by three fewer able students compared with fifty-three fewer selections for the average private IHL. Equally important, entering freshman enrollment increased by 202 students at a typical public college and decreased by twenty at the private counterpart. The striking implication is that public colleges are not only attracting the attention of more good students relative to their size but are accomplishing this with an increased enrollment. Enrollment forms the denominator of the attractiveness indices so that any increased enrollment in 1972-73 would tend to lower the attractiveness change indices. This did not occur at most public institutions. The public colleges gained in enrollment and in attractiveness. These results are summarized in Tables 4 through 8.

The conclusions are tempered by the associated standard deviations. The very high statistical significance (generally 0.0001) reflect the magnitude of the difference between the averages and the size of the sample not the uniformity of behavior within either sector or within any third of either sector. There is an abundant overlap between the sectors and between thirds of the sectors. Again, caution must be used when interpreting all the tables because of these large standard deviations.

The differences between the sectors were more pronounced than expected but consistently in the directions predicted. Private colleges suffered a very significant decline in attractiveness relative to public colleges while simultaneously losing enrollment to the public colleges. When the sectors are divided into thirds according to their 1964-65 selectivity scores, the less attractive institutions surpass the more attractive ones on the change indices and in change in absolute selections -- a clear divergence from expectations. The lowest third of both sectors show gains in attractiveness with the public sector faring a little better than the private sector. The percentage change index for the public sector is up 71%. For the private sector the index is up 49%. The differences in the two indices is modestly significant at the 0.10 level. The public IHL and private IHL in the middle range of attractiveness declined 2% and 24% respectively. These differences reflect a level of significance higher than 0.0001. The most attractive public and private institutions declined 22% and 50% respectively. Again, statistical significance is 0.0001. To reduce statistical litter in the exposition, the reader is invited to reexamine Table 7 where he will note parallel trends in popularity change. These results are contrary to the expectation that the most attractive insti-

tations would have fared best. How can this divergence be explained?

Although "regression to the mean" is a possible interpretation and, undoubtedly, accounts for some of the discrepancy there are other explanations. Viewing each of the sectors separately, one notices an inverse relationship between size change and popularity change. The less attractive an institution the greater the increase in selections by able students. (In the private sector this translates to smaller decreases.) However, the most attractive institutions are more likely to show enrollment increases. (Again, for most of the private sector this translates to smaller decreases.)

Size change and popularity change appear to be inversely related. What may have occurred is that the most selective institutions in 1964-65 were able to trade on their selectiveness; they were able to maintain substantial growth at some cost in prestige. The least attractive institutions could not grow as rapidly. The middle colleges rank in between in both categories. This suggests a competition for students for which the most attractive schools were better fitted. This is not to gainsay the enrollment growth of junior colleges. Public two-year colleges comprise only eleven percent of the least attractive public colleges in this study. Cost may be another related factor. The less attractive college, whether public or private, typically serve a more local clientele. These schools are not only more likely to charge lower tuition but students will often live at home and save additional money. As college costs becomes an increasing burden to families many bright students may attend a less desirable but more reasonable local college. In succeeding years these local colleges may become more prestigious by dint of the attendance of brighter

students. Another explanation is that increasing enrollment and decreasing attractiveness in the more attractive colleges may reflect a conscious policy to "democratize" the institutions—opening up the more selective institutions to the expanding enrollments of the 1960's. This rationale would seem to be more applicable to public than private IHL. A final consideration is that division of the sectors into thirds may not have been refined enough to develop a complete picture of changing attractiveness and popularity.

State Analysis: The state regression analysis shows two variables to be significant. The "growth" variable with a negative coefficient, explained six percent of the variance and is significant at the 0.05 level. The "tuition effort" variable also explains six percent of the variance and is significant at the 0.05 level. It has a positive coefficient. Neither the direct aid nor the student aid variables are significant. In fact, the direct aid variable has an unexpected negative coefficient. Total R^2 for the regression is fourteen percent. Thus there is tentative support that both the rapid physical expansion of the public colleges and the low tuition policy are luring bright students from the private colleges. The relative modest significance levels in this analysis are not surprising in view of the qualifications noted above.

Table 4
Average Selections and Attractiveness for all 1,228
Colleges and Universities in the Study

Public Sector				
	# of Public IHL	1964-65 Selections	1964-65 Attractiveness	1972-73 Selections 1972-73 Attractiveness
Low 1/3	165	16	1.7	26 2.8
Med 1/3	167	63	7.0	74 6.6
Top 1/3	169	520	26.0	491 19.7
Entire Sector	501	201	11.6	198 9.7
Private Sector				
	# of Private IHL	1964-65 Selections	1964-65 Attractiveness	1972-73 Selections 1972-73 Attractiveness
Low 1/3	237	22	5.3	22 6.5
Med 1/3	240	67	17.0	49 12.4
Top 1/3	241	327	58.0	186 28.0
Entire Sector	718	140	27.0	87 15.7

Table 5

Summarized Percentage Changes in Attractiveness for all 1,228
Colleges and Universities in the Study

1964-65 Attractiveness Grouping	Public Sector				Private Sector				Statistical Significance of Differences in Averages
	# of Public IHL	Average Attractiveness Change	Standard Deviation	# of Private IHL	Average Attractiveness Change	Standard Deviation			
Low 1/3	165	70.633%	151.664	237	49.308%	197.836	0.111		
Med 1/3	167	-2.148%	44.005	240	-24.309%	39.049	0.0001		
Top 1/3	169	-21.630%	34.556	241	-50.364%	28.972	0.0001		
Entire Sector	501	15.287%	100.799	718	-8.790%	124.302	0.0001		

Table 6

Summarized Changes in the Transformed Index for all 1,228
Colleges and Universities in the Study

1964-65 Attractiveness Grouping	# of Public IHL	Public Sector			# of Private IHL	Private Sector			Statistical Significance of Difference in Averages
		Average Change	Standard Deviation			Average Change	Standard Deviation		
Low 1/3	165	0.299	0.622		237	0.140	0.920		0.02
Med 1/3	167	-0.120	0.577		240	-0.687	0.978		0.0001
Top 1/3	169	-0.718	1.035		241	-2.353	1.578		0.0001
Entire Sector	501	-0.183	0.773		718	-0.973	1.587		0.0001

Table 7

Summarized Changes in Popularity for all 1,228
Colleges and Universities in the Study

1964-65 Attractiveness Grouping	Percent Change	Public Sector		Private Sector		Statistical Significance of Differences in Averages
		Average Change in the Number of Selections	Standard Deviation	Average Change in the Number of Selections	Standard Deviation	
Low 1/3	62%	10	19.3	0	27.4	0.0001
Med 1/3	18%	11	42.8	-18	53.3	0.0001
Top 1/3	-5%	-29	260	-141	177	0.0001
Entire Sector	-1%	-3	155	-43	125	0.0001

Table 8

Summarized Changes in Enrollment for all 1,228
Colleges and Universities in the Study

1964-65 Attractiveness Grouping	Percent Change	Average Size Change of Freshman Class	Standard Deviation	Percent Change	Average Size Change of Freshman Class	Standard Deviation	Statistical Significance of Differences in Averages
Low 1/3	8%	91	680	-11%	-46	216	0.006
Med 1/3	18%	164	413	-9%	-34	184	0.0001
Top 1/3	19%	348	666	4%	20	170	0.0001
Entire Sector	16%	202	579	-5%	-20	193	0.0001

Institutional Analysis: Table 9 summarizes the results of the step-wise regression. Because of the collinearity problem, order of entry must be considered and interpretation must be made with care.

The variable with the most explanatory power is the control variable, ATTRACT. An obvious interpretation is that a considerable amount of random error existed in the index with the resultant "regression to the mean." This variable explains 42% of the variance and is significant at the 0.01 level. However ATTRACT has a high correlation with PH.D. (0.80) and TUITION (0.40). If the regression is constrained such that PHD enters first, PHD explains 29% of the variance. Furthermore, if TUITION enters first, it explains 25%. This web of intercorrelations cannot be untangled and the analysis proceeds under this limitation. But because the other variables enter after ATTRACT their indicated explanatory power may be considered conservative.

TUITION enters next: It has a negative sign as expected and the next highest explanatory power, 7%. It is significant at the 0.01 level. SURPLUS has an unexpected negative sign, explains 4% of the variance and is significant at the 0.01 level. DRESCH has a positive sign and explains 4% of the remaining variance. Again the level of significance is 0.01. PHD also explains 5% of the variance with a positive coefficient and is significant at the 0.01 level. DPHD has a positive coefficient but explains only 1% of the variance. Its level of significance is a modest 0.1. Although LVNG has an unanticipated positive coefficient, it has no explanatory power and is statistically insignificant.

Table 9 Regression: Change in attractiveness = f(ATTRACT, PHD, TUITION, SURPLUS, DRESCH, DPHD, LVNG)

Variables listed in order of entry	Coefficient	Standard error of coefficient	F-statistic to enter	F-statistic final	Variance explained
ATTRACT	-0.03	0.0041	75*	57*	42%
TUITION (\$100)	-0.03	0.0002	14*	4*	7%
SURPLUS	2.37	0.4469	8*	28*	3%
DRESCH	0.25	0.0496	11*	25*	4%
PHD	8.22	2.1937	13*	14*	5%
DPHD	3×10^{-5}	2×10^{-6}	2**	2**	1%
LVNG	N.A.	N.A.	<1	N.A.	0
					$\frac{0}{63\%}$

* significant at 0.01 level

** significant at 0.10 level

does not add due to rounding

Causal Speculation: With regard to causal explanation, the author is not suggesting that high school juniors are specifically selecting or rejecting a college on the basis of the number of doctorates on the faculty or the faculty research efforts. Similarly consumers don't buy Proctor and Gamble soap products on the basis of the firm's marketing budget; but there is a causal relationship. It is posited that information on the academic competence of institutions is diffused into the community. This is likely to occur through media coverage and also by word of mouth.

The impact of tuition charges is probably even less direct. High tuition levels are unlikely to change the preferences of these scholarship-hopeful students. But as most of these students receive only an unremunerative "honorable mention" for their scholarship efforts, the less expensive institutions undoubtedly become more attractive. As these bright students tend to enroll in less expensive public colleges and as private institutions tend to dip more deeply into their applicant pool, there is a relative shift in the selectivity of the two sectors. If the educational and credential value of selective admissions policies are valued by prospective students, then the subsequent selections of high school juniors will be altered in the manner exhibited in this study.

The SURPLUS variable is presumably a catch-all variable. Institutions which are enjoying surpluses are likely to offer a combination of services which is superior to those of the deficit laden college. This difference in services was apparently important but not captured by any other single variable in the analysis.

SUMMARY

This research examines the changing patterns of expressed college preferences on the National Merit Scholarship Qualifying Tests in 1964-65 and 1972-73. Before discussing the conclusions, the reader is reminded of the methodological limitations of the study. Among the most significant are the following: 1) the large standard deviations in the national analysis, 2) the limited number of cases available for the state analysis, 3) the limited response rate for the institutional analysis, and 4) the high multicollinearity of the institutional independent variables.

Although the average private college is still somewhat more selective than the average public college, it will not remain so if the trends uncovered in this study are sustained. It is well known that public colleges are enrolling a larger and larger percentage of the total number of college students. This fact is reaffirmed by this research. However, this study also demonstrates that the public IHL are becoming relatively more appealing to bright students in terms of absolute selections and more appealing even when selections are corrected for the size of the institutions. This is disturbing evidence for those private institutions which are attempting to compete as "selective."

This research posits that many institutions have maintained enrollment levels and avoided serious deficits conditions by trading on their image of selectivity. Some may have hired less competent faculty. Others may have limited research by raising the required teaching loads, and still others may have admitted students whose financial qualifications exceeded their academic prowess. Striking evidence for this is available by examining the most at-

tractive third of the private sector. Enrollment went up four percent; but the average attractiveness index for this group declined fifty percent! This decline may be more prophetic than their enrollments and balance sheets.

When four state variables were tested against the relative ability of the private sector to compete for able students, only two exhibited modest statistical significance. Growth in the number of public institutions had a negative effect. And, in those states where tuition income represented a larger portion of the educational and general income at the public institutions, the private colleges competed more favorably. While state student aid and state aid to private higher education appeared to be inconsequential, this must reflect the generally low level of aid that was available.¹⁷ Certainly, were there enough aid, it would offset low tuitions in the public sector. However, to those who advocate aid to private institutions rather than lowering tuitions in the public sector, these results suggest that future aid must be much greater than it has been.

The institutional analysis provided few surprises. If a college wants to attract good students, it should: (a) charge low or no tuition; (b) hire the most highly qualified faculty available; (c) attract large amounts of research dollars; and (d) avoid general fiscal constraints. But for the college that is other than ethereal, there are no easy answers. For the very corporeal private institutions struggling to market themselves as selective, the findings of this research are indeed distressing, if not unexpected.

NOTES

1. National Center for Educational Statistics data reported in the Chronicle of Higher Education, June 24, 1974.
2. Association of American College data reported in the Chronicle of Higher Education, October 15, 1974.
3. Michael Clurman, "Does Higher Education Need More Money?" in Economics and Financing of Higher Education in the United States, Washington, D.C.: U.S. Government Printing Office, 1969, p. 637.
4. Humphrey Doermann, Crosscurrents in College Admissions, New York: Teachers College Press, 1970, p.3.
5. Christopher Jencks and David Riesman, The Academic Revolution, Garden City, New York: Doubleday 1968, p. 272.
6. Robert Nichols, College Preferences of Eleventh Grade Students, National Merit Scholarship Corporation Research Report, Vol. 2, No. 9 Evanston, Illinois: NMSC, 1966.
7. Ibid., p. 22.
8. One problem is that since 1964-65, the NMSC contracted to use the Preliminary Scholastic Aptitude Test (PSAT) administered by the Educational Testing Service. The PSAT has verbal and mathematical scores. This research uses a conversion of the two scores. This conversion formulated by analysts from ETS and NMSC, was created to be equivalent to the old NMQT score.

The most significant difference appears to be the change in test dates. The 1972-73 exam was administered in October of the academic year and the 1964-65 exam was administered in March. While the October test date was probably a major influence on the severe decline in students indicating colleges preferences, it is problematic whether this biased the results. If the students taking the October exam were less knowledgeable about particular colleges and universities then they may have tended to select more populous and visible state institutions. If, however, the students taking the October exam were less likely to have discussed costs with their parents, then they may have been more likely to have chosen higher cost private colleges. The first possibility would bias the data to make the public institutions appear stronger on the change indices. The second would make the private colleges appear healthier. This study assumes that neither phenomenon overwhelms the other.

9. One reason for this is that Nichols excluded all institutions that did not have twenty-five or more selections. Another reason is that community colleges have proliferated since 1964.
10. Opening Fall Enrollment in Higher Education, 1964, Washington, D.C.: U.S. Department of HEW, Office of Education, Higher Education Surveys Section, Division of Educational Statistics, Government Printing Office, 1964.
11. 1972 Opening Fall Enrollment: First Time Freshmen in Bachelor's Degree Credit Programs. An unpublished report of the Office of Education.

12. One problem is that an institution which was selected by no students in 1964-65 and by one in 1972-73 would show an infinite increase. Another problem is that an institution increasing from point A to point B has the greater percentage increase than the percentage decrease of an institution moving from point B to point A. Finally, for this data there was a problem of heteroskedasticity; that is the unexplained error was proportioned to the value of the measure. The transformed index did not exhibit these problems.
13. M.M. Chambers, Appropriations of State Tax Funds for Operating Expenses of Education 1967-68, Washington, D.C.: National Association of State University and Land Grant Colleges, 1968.
14. M.M. Chambers, Appropriations of State Tax Funds for Operating Expenses of Education 1968-69. Washington, D.C.: National Association of State University and Land Grant Colleges, 1971.
15. Although the percentage change index showed a slight increase (+1%), this is not really a direct contradiction. It reflects the aforementioned problem; "unattractive" schools with slight increases in selections can dominate the percentage change index.
16. The changes on the transformed index were -0.183 and -0.973 for the public and private sectors respectively. This difference is also significant at the 0.0001 level.
17. Larry Leslie used a questionnaire to determine the effectiveness of state scholarship programs in five states. He determined that when student aid programs are designed to increase attendance in the private sector, they can indeed be quite effective.

Appendix A

Full List of Independent Variables for Institutional Analysis

- Doctorates on the faculty per student (average 1964 and 1972)
- Change in the number of doctorates on the faculty per student
- Research income per student (average 1964 and 1972)
- Change in research income per student
- Tuition (average 1965 and 1972)
- Change in tuition
- Room and board charges (averages 1965 and 1972)
- Change in room and board charges
- Instructional expenditures per student (average 1964 and 1972)
- Change in instructional expenditures per student
- Surplus (deficit) per student (average 1964 and 1972)
- Change in surplus (deficit) per student
- Public instructional income per student (average 1964 and 1972)
- Change in public instructional income per student
- Gift and endowment income per student (average 1964 and 1972)
- Change in gift and endowment income per student
- Plant value per student (average 1964 and 1972)
- Change in plant value per student
- Enrollment (average 1964 and 1972)
- Change in enrollment
- Student aid expenditures per enrolled student (average 1964 and 1972)
- Change in student aid expenditures per enrolled student
- Percentage of E&G income derived from tuition (average 1964 and 1972)
- (Tuition)²
- Attractiveness 1964-65
- Change in the number of NMSC scholarships sponsored
- Public (0)/private (1) institution
- Non-technical (0)/technical institution

APPENDIX B: Varimax Rotated Factor Matrix

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Attractiveness 1964-65	0.78	0.17	-0.15	0.49	0.04	0.14	-0.08
Tuition	0.27	0.89	0.08	0.04	-0.12	0.25	0.10
Surplus (deficit) Stu	-0.24	-0.09	-0.08	-0.04	0.06	0.03	0.09
Research \$/Stu	0.51	0.07	0.18	0.81	0.04	0.14	0.01
Public \$/Stu	0.03	-0.71	-0.19	0.05	0.16	0.20	0.37
Instructional \$/Stu	0.960	0.01	0.18	0.14	-0.03	-0.03	-0.06
Doctorate/Student	0.963	0.03	0.12	0.11	-0.00	-0.01	0.01
Gift & Endow \$/Stu	0.83	0.13	0.47	0.19	-0.01	-0.01	0.00
Plant/Student	0.957	0.08	0.19	0.07	-0.02	0.07	0.03
Chg Instruct \$/Stu	-0.67	0.01	0.61	-0.05	0.06	0.09	0.37
Chg Research \$/Stu	0.24	0.08	0.20	0.92	0.04	0.19	0.05
Chg Gift & Endow \$/Stu	0.43	0.12	0.76	0.30	-0.00	0.03	0.24
Chg Plant/Student	0.85	0.08	0.13	0.31	-0.00	0.18	0.03
Chg Doctorates/Student	-0.03	-0.27	-0.06	0.04	0.84	0.15	0.03
Chg Tuition	0.14	0.87	-0.03	0.26	-0.06	0.16	0.14
Chg Surplus (deficit)	-0.18	-0.07	-0.76	0.02	0.06	-0.09	0.15
Chg Public \$/Stu	0.03	-0.56	-0.15	-0.19	-0.09	0.12	0.35
Tuition Squared	0.35	0.79	0.08	0.07	-0.09	0.26	0.14
Average Room & Board	0.20	0.29	0.14	-0.06	0.11	0.92	-0.10
Chg Room & Board	-0.08	-0.01	-0.01	0.13	0.07	0.47	0.06
Student Aid \$/Stu	0.81	0.16	0.40	0.27	-0.02	0.09	0.15
Chg Stu Aid \$/Stu	0.50	0.28	0.49	0.43	0.03	0.18	0.27
Avg Number of Freshmen	-0.01	-0.28	-0.04	-0.00	0.05	0.07	-0.03
Chg Number of Freshmen	-0.08	-0.37	-0.11	-0.14	0.07	-0.18	-0.02
Tuition/E & G Expenses	-0.22	0.59	-0.01	-0.12	-0.23	-0.18	-0.18
Private/Public	0.08	0.88	0.10	-0.01	-0.25	0.10	-0.11
Tech/Non-Tech	0.45	0.05	-0.14	0.65	-0.03	-0.12	-0.15
Chg Scholar Sponsored	-0.01	0.29	-0.04	-0.04	-0.02	-0.05	0.16